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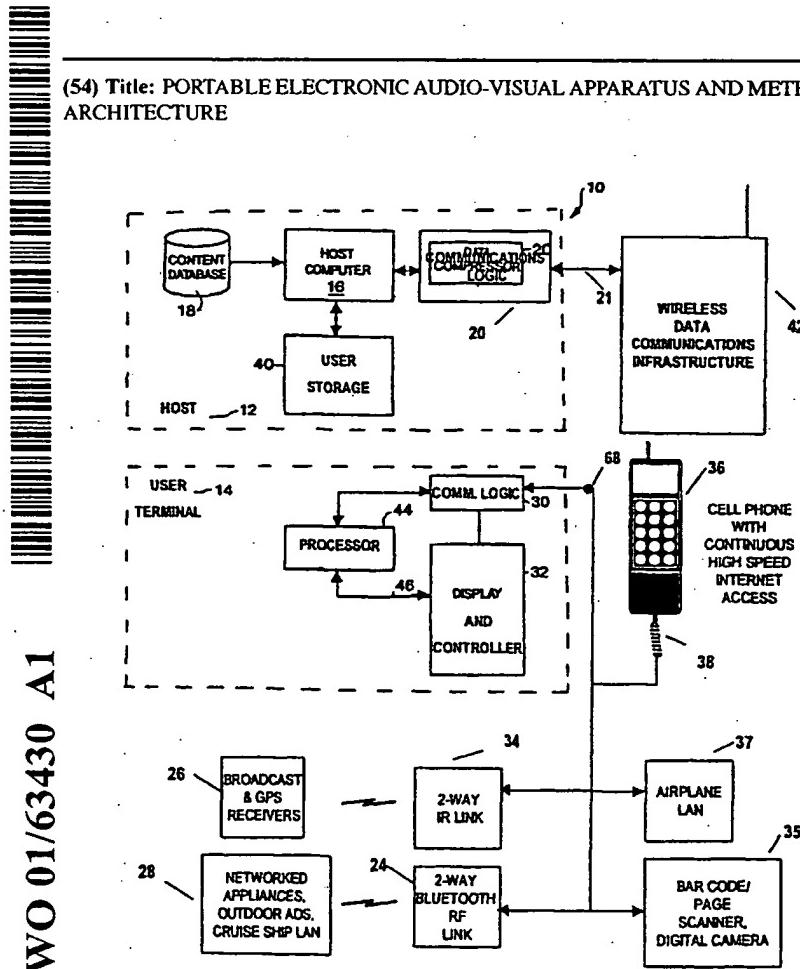
(57) Abstract: A cellular network providing continuous high-speed internet access (36) enables a portable device to receive copyrighted text/audio/video materials while providing a high level of security against illegal copies of such works. The device is multi-purpose and eliminates the need for any non-volatile data storage. The system accommodates additional applications such as those found in PDAs as well as in music download devices. Method of including the system features into portable PCs are also disclosed, as well as methods of interfacing with broadcast receivers (26), networked appliances and outdoor advertising (28).

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PORTABLE ELECTRONIC AUDIO-VISUAL APPARATUS AND
METHOD EMPLOYING CELLULAR NETWORK ARCHITECTURE

Field of the Invention

The present invention relates generally to the publication and distribution of

electronic reading materials and audio and visual entertainment, and, in particular, to

methods and apparatus for viewing electronic reading and other visual materials, and

5   listening to audio materials, in a portable environment.

Background of the Invention

There is a need for a system for retaining a library of publications and audio

selections and for selectively providing these publications to a portable terminal for

reading and listening. There is also a need for providing a secure communications

10   system that permits the electronic reading of and listening to copyrighted materials

without concern for their proliferation through present on-line services.

In U.S. Patent 5,956,034, there is disclosed an electronic publication

publishing and distribution system for dissemination of written materials that can be

read on a portable electronic book. A host computer contains an inventory of written

15   materials in electronic form, that can be selected and then downloaded into the

portable electronic book's memory.   The host computer keeps track of the

transactions, and encodes the data prior to downloading, using an encryption system

involving a security number, or key, that is unique to the portable electronic book.

The encrypted data cannot be decrypted until it is resident in the memory of the

20   portable electronic book. Upon receipt of the encrypted data, the portable electronic

book decrypts the data, and can display the text of the original material on its display

screen. The portable electronic book has a central processing unit with an operating system for controlling the functions of the portable electronic book. There is non-volatile electronic memory storage for retaining publications in the portable electronic book.

5   The prior art as represented in the aforementioned patent permits the user to download entire copyrighted works into local non-volatile memory, and relies on a public key system for security. Because the entire work, although encrypted, is available to a user on a permanent basis, there is every likelihood that the encryption will eventually be broken, and the copyrighted work illegally copied, in spite of the security precautions. With respect to the business aspects of so-called e-books, publishers remain concerned that entire works are being transferred to users, and hardware manufacturers remain concerned about the high cost of producing dedicated readers of the type described in the prior art.

Summary of the Invention

15   This invention resides in communication methods and apparatus which afford enhanced protection of copyrighted works. In the preferred embodiment, information is received from a host site at a user terminal in piecemeal or incremental fashion, such that the information in its entirety is never resident at the user terminal. The information is also preferably temporarily stored at the user terminal in a volatile as 20 opposed to a non-volatile form of memory, with each newly received portion replacing the previously received portion, thereby providing a high level of security against illegal copies. Subsequent portions of a work may be downloaded to the terminal upon request or in response to user action at the terminal to implement

"streaming-on-demand." For example, after being sent pages 1 and 2 of a work, the user only gets sent pages 3 and 4 after she has read page 1, as detected by the host when the user selects page 2 for display.

In terms of apparatus, the user terminal is preferably a portable, hand-held
5 device which communicates with the host through a cellular wireless network providing continuous high-speed internet access as part of a client-server architecture. Depending upon the type of media player available at the user terminal, textual, graphical, audio and/or video information may be received from the host. Information displayed at the user terminal may also include hyperlinks enabling a user to purchase
10 goods or services by debiting an internet, telephone, credit, or other type of account. The hyperlinks may also be used to initiate a telephone call to a third party.

One or more hosts may service a plurality of user terminals, in which case a host site may further includes a user storage area enabling information, which may include one or more copyrighted works, to be stored specifically with respect to one
15 of the user terminals. The system accommodates additional applications such as those found in PDAs as well as in music download devices. Methods of including the system features into portable PCs are also disclosed, as well as methods of interfacing with broadcast receivers, networked appliances and outdoor advertising.

Brief Description of the Drawings

20   FIGURE 1 is an overall block diagram of the publication and distribution system 10 of the present invention;

FIGURE 2 is one embodiment of the user terminal 14 of the present invention, as utilized in the system 10 of Figure 1;

FIGURE 3 is a detailed block diagram of the user terminal 14 of Figure 2;

FIGURE 4 is an exemplary display page provided on the terminal 14 to enable a user to choose a terminal application;

FIGURE 5 is an exemplary display page provided on the terminal 14 showing the interface to an FM radio broadcast log, and system features for use therewith;

FIGURE 6 is an exemplary display page provided on the terminal 14 showing the interface to a radio station current program schedule, and system features for use therewith;

FIGURE 7 is an exemplary display page provided on the terminal 14 showing the interface to outdoor advertising, and system features for use therewith; and

FIGURE 8 is an exemplary display page provided on the terminal 14 showing the interface to photography and scanning applications, and system features for use therewith.

Description of the Preferred Embodiments

U.S. Patent No. 5,956,034, issued September 21, 1999 to Sachs, et. al, and entitled Method and Apparatus for Viewing Electronic Reading Materials is incorporated herein by reference in its entirety, and is hereafter referred to as the "'034 reference." All references to "text" are meant to include graphics and image files, and references to "broadcast receivers" are meant to include receivers for radio, television, cable, and satellite signals, as well as VCRs, PVRs, and GPS receivers.

Referring now to Figure 1, the system 10 of the present invention includes host 12 and user terminal 14. The host 12 includes host computer 16, content database 18, communications logic circuits 20, and user storage memory 40. The

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communications circuits 20 in turn are connected to, and bi-directionally communicate with, a wireless data communications infrastructure 42. The infrastructure 42 is preferably a cellular telephone network having high-speed data communications capability in addition to voice communications. In particular, the structure 42 is designed to provide to its cell phone customers continuous, anytime/anywhere, high-speed internet access using a packet-switched network. Such systems are just now becoming widespread throughout Japan and Europe, using wideband CDMA technology to provide continuous internet access to cell phone users at data rates up to 2 megabits/sec. An example is the i-mode system by the DoCoMo division of NTT, Tokyo, Japan. In one application of these phones, a Wireless Application Protocol (WAP) is employed to display internet web pages on the small screens of these phones. However, by coupling these phones to a larger display, significantly more visual information can be received and displayed.

The user terminal 14 is designed to be a portable battery operated device which includes communications logic circuits 30 connected to a microprocessor 44 which is in turn connected to a display controller and display unit 32. The communications circuits 30 in turn are connected via connector 68 to and bi-directionally communicate with a cell phone 36 configured to function with the cell phone network 42 to wirelessly send and receive internet compatible packet data to and from servers connected to the internet, all on a continuous and high data rate basis.

The host computer 16 acts as a network server, is connected to the internet, and manages a content database 18 which contains a variety of text, graphics, audio and video information, including copyrighted publications or works. In the process of

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providing access to these works, the host computer 16 communicates with the microprocessor 44 in the portable user terminal 14 via the internet 21, the cellular system 42 and the cell phone 36. The user terminal 14 is preferably configured as a general purpose "dumb terminal" primarily designed to display text and graphics and

5   provide audio signals to speakers and/or headphones. As is known in the art, a dumb terminal is very limited in its capabilities, and is designed to act as a user interface to a host, which provides substantially all of the program logic and all of the data storage and manipulation. In the present instance, the host 12 provides a separate data storage area for each user in the storage unit 40, under control of computer 16.

10   In operation, whenever the cell phone 36 is turned on, it establishes a continuous high-speed connection to the internet via the system 42. The processor 44 communicates with the phone 38 via the logic circuits 30, which include interface and driver circuits suitable for communication with a wide range of communications devices, as described below, and via a data port 38 of the phone 36. It is envisioned

15   that the circuits 30 will include a Universal Serial Bus (USB) connected to the connector 68 to enable the simultaneous connection and operation of multiple devices to the terminal 14.

By entering the IP address for the host computer 16 into the phone 36 (or via soft keys on the display of the unit 14), the processor 44 can be used to communicate

20   with the computer 16. Once connected, the user logs into the host 16 using conventional user name and password protocol. The host 16 can also obtain from the phone 36 the telephone number and the serial number permanently assigned to the phone, as additional or substitute verification as to the identity of the user. Presuming the user is registered with the host, the computer 16 controls the terminal display 32 to

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display a variety of menu choices as shown later.

　　　　If the user wants to read a book, for example, she can choose one using the terminal controls, and the host will load the book into a designated storage area of the non-volatile memory 40 for use by that user, and will display one page of the book on

5　　the display 32.　The user can move between pages using suitable terminal controls, but there is no provision to store any portion of the book on the terminal 14 in a non-volatile manner.　Instead, a display buffer in the terminal 14 is used to store one (or perhaps a few) pages in a volatile memory strictly to support the display.　The buffer is refreshed every time new pages are requested.　The only place where the entire

10　　book is stored in a non-volatile manner is at the host 12.　The terminal 14 merely acts to provide commands to the host. via keys and a touch screen, and to display the results in a volatile fashion.

　　　　Since the user never has nonvolatile possession of the entire copyrighted work, the chance of illegal copying is substantially reduced as compared to the prior art.

15　　Since the terminal 14 is a general-purpose dumb terminal, it can be reconfigured by the host to perform functions other than book reading, such as a PDA, for displaying appointments, calendars, address books and the like, all of which are stored at the host and displayed at the terminal.　As a result of its multi-purpose nature, the cost of the terminal is more easily justified, as compared to a dedicated book reader. Because of

20　　the continuous and high-speed nature of the wireless connection, the response of the host will appear to be near instantaneous to the user, especially since the bulk of the data is in the form of text, which is not data-bit intensive and is easily compressed to further increase transmission speed in a manner well known to those skilled in the art.

　　　　In order to accommodate multiple uses, the terminal 14 may be connected, via

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the communication logic circuits 30 and the USB 68 to IR and RF communications

links 34, 24 to communicate with local broadcast receivers (radio, TV, cable) and

networked·appliances and interactive outdoor advertising, respectively. In particular,

the IR link 34 can send commands to control conventional IR remote controlled

5   broadcast receivers 26, and the RF link can be configured using the recently industry

adopted BlueTooth protocol for communicating short distances with other appliances

and BlueTooth equipped Local Area Networks (LANs) 28. The USB can also be

used to connect via cable to a LAN 37, and to optical devices such as digital cameras,

bar-code readers and scanners 35, as more fully described below.

10   Figure 2 shows an embodiment of the portable user terminal 14 of the present

invention, as utilized in the system 10 of Figure 1. Constructed in a manner similar to

the display unit described in the '034 reference, the user terminal 14 is a rectangular

unit of six to 8 inches in width, seven to ten inches in height and about one inch thick.

The terminal has a front face 50, a top 52, a base 54, a first side 55, a second side 56

15   and a back 58. The front face 50 includes a display screen 60, which may be a liquid

crystal display (LCD), cathode ray tube (CRT), electro-luminescent display (EL) or

other display device as is known in the technology. In a preferred embodiment, the

display screen 60 is an LCD. Located next to the display screen 60, along the second

side 56, are a plurality of keys or function switches 62, which are used to select icons

20   displayed on the display screen 60. These icons represent a variety of functions that

are provided by the terminal 14, as will be discussed in detail in the following

sections. The brightness of the display screen 60 is controlled by an LCD adjust

switch 64 located below the display·screen 60, at the bottom of the front face 50.

Located on the top 52 of the terminal 14 is a switch 66 for powering the

portable display unit 32 on or off. In addition, communications jacks 68 are located on the top 52, as is a connector 70 for connection to an AC adapter/battery charger 72. The portable display unit 32 may be powered by batteries such as Lithium Ion batteries. The terminal 14 also includes an electronics module (not shown), which

5   includes a central processing unit (CPU), memory units including Program Read-Only Memory (ROM), Program Random Access Memory (RAM), volatile display buffer memory the LCD driver, a charge circuit and a clock, a pen 63 and digitizer screen overlaid on the display screen 60, and optionally a keyboard (not shown) and an MP3 music decoder.

10   The jacks 68 communicate with the USB portion of circuits to connect the terminal 14 to the phone 36 the IR link 34, the RF link 24, LANs 37 and optical devices 35. Alternatively, some or all of these devices (particularly the phone 36, the IR link 34, the RF link 24, and optical devices 35) can be built into the terminal 14; in which case an antenna 59 is included. Conversely, the functions of the terminal 14,

15   the links 34 and 24 and optical devices 35 can be built into a cell phone such as the phone 36. A slot 57 is also provided in the housing to accommodate a smart card for removable RAM. Further, while phone 36 and optical devices 35 are shown as cable connected to the terminal 14, alternatively, these devices can communicate with the terminal 14 via the BlueTooth RF link 24.

20   Figure 3 is a detailed block diagram of the user terminal 14. The unit 14 is controlled by the central processing unit (CPU) 44, which can execute program instructions from Read Only Memory ROM (ROM) 82, or Random Access Memory (RAM) 86, which may additionally include a Smart Card inserted in slot 57. These program instructions 82a, and 86a located in ROM 82 and RAM 86 respectively,

provide the control for all the local operations of the terminal 14. The program

instructions in ROM 82 are permanent and are those command and control

instructions which are common to all of the applications of the unit 14, and are

essential for its operation. The program instructions 86a in RAM 86 are downloaded

5   to the unit 14 by the host computer 16 (or may be stored in the Smart Card) to

configure the unit 14 for different applications, as described below. Note that no non-

volatile memory is provided for downloaded user data.

The CPU 44 is connected to the communications circuits 30 which preferably

include a USB, which is in turn connected via jacks 68 to the cell phone 36 and

10   optionally to the other local communications links 24, 34 and devices 35, 37 as ·

described above. The use of a USB permits the simultaneous connection of multiple

communications devices, as is well known in the art. The processor 44 also controls

display 60 through controller 90 and display buffer 96, which is designed to store a

few pages of text in a volatile FIFO type buffer well known to those in the art. The

15   processor also receives input from a switch matrix 94 which decodes signals from

switches 62, and communicates with audio circuits 82 which include suitable A/D and

D/A functions so that digital signals from the processor 44 into the circuits 82 result

in analog audio output signals which can be used to drive earphones or speakers; and

so that analog audio signals into the circuits 82, preferably from a microphone, are

20   converted to digital signals for processing by the processor 44 and for transmission to

the host 12.

Optionally a keyboard 80 may also be provided, where it is implemented in

hardware or in soft form using the touch screen 60, and an MP3 format streaming

music decoder 88 can be added to decode music downloaded from the host, to be

played through the circuits 82. Note that the cell phone 36 includes both a microphone and an ear-sized sound transducer, as in the case of most phones. It is envisioned that the phone 36 microphone and speaker can be used as part of the terminal 14 to provide audio input and output for some of the applications. If the

5   phone 36 is built into the terminal 36, this functionality is readily available. If the phone is separately connected, it is envisioned that a cable would be provided to connect from the cell phone audio jack to a suitable audio jack (not shown) provided on the terminal 14, whereby the audio signals detected by the phone microphone and reproduced by the ear speaker are provided to the audio circuits 82. For example, the

10   phone speaker could be used to reproduce downloaded music, and the phone microphone could be used to detect music reproduced in the vicinity of the user, as described below.

The operation of the system 10 is as follows. As described above, whenever the cell phone 36 is turned on, it establishes a continuous high-speed connection to the

15   internet via the system 42, and the processor 44 communicates with the host computer 16 after suitable web addresses are entered and a logon procedure is completed, all in a conventional manner. Additionally, the system 42 sends user ID information to the host 12, such as the phone number and serial number of the user's phone 36. Similarly, software in the terminal 14 is used to interrogate the connected phone 36 to

20   obtain the same user ID information, which can be used for encryption keys.

Once the registered user is logged in, the computer 16 controls the terminal display 32 to display a variety of menu choices as shown in Figure 4. Typical applications for which the terminal 14 can be configured by the host 12 are reading of books and periodicals, an address book and appointments (much like a Personal

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Digital Assistant like Palm Pilot), games, surfing the Web, TV and radio schedules, streaming music, and interacting with local outdoor advertising. Once a user has made a choice, using either the switches 62 or soft switches represented by touch screen icons, these responses are communicated to the host computer 16, which downloads

5   to the unit 14 executable code in the form of program instructions 86a, which are stored in RAM 86. These instructions configure the terminal for the particular application.

By way of example, if "Books" is chosen as the application, the terminal 14 is configured so that switches and icons are generated to perform the typical functions

10   necessary or desirable to support reading. These include the features disclosed in the '034 reference, such as the navigation of the content database 18 to find a book of interest, page turning, dictionary, underline, font size, page marking, hyperlinks, etc. Once a book is selected from the database 18, it is loaded into the user's storage area in the memory 40 at the host, and becomes that user's version of the book.

15   Subsequent notations or modifications to the text made by the user are recorded and stored with the text in the user's storage 40.

It should be noted that the function of the programmed terminal 14 is limited to accepting user input and conveying it to the host computer 16, and receiving and displaying text and graphics provided by the host. Thus, all of the features listed

20   above for book reading take place at the host, not at the terminal, and are stored at the host in unit 40. However, due to the continuous high-speed link the actions appear to be nearly instantaneous. Thus a command from the terminal 14 to underline a sentence is sent to the host 12, where it is executed, and the resultant underlined text is sent back to the display 60. A record of the underlining is stored in the unit 40 as

part of the user's version of the book. Alternatively, sufficient logic can be downloaded into the terminal 14 so that, for example, an underline command is executed at the terminal 14 (directly underlining the displayed text), and in addition, the user command is sent to the host 12, where it is stored as part of the user's version

5   of the book. In such instance, whenever the user returns to the page with underlining in the future, the underlining will again appear as a result of the page downloaded from the host 12. Similar operation can be provided for other reading features, where the feature is executed both locally and at the host.

The host also keeps track of where the user is in the book, so that in a

10   subsequent reading session, the user is automatically returned to the same point. Whenever the user completes a reading session, either by turning the device off or by selecting a different terminal application, the display buffer 96 is cleared of stored text. While in the above description it is anticipated that the display buffer 96 is configured to hold only a few pages, it could be implemented to store an entire book

15   or other periodical in volatile form. Again, when the user completes a reading session, all stored text is cleared.

When the user requests a certain page, or next page of the book, it is sent to the terminal and temporarily stored in the display buffer 96. Logic may be included whereby if it appears that the user is reading in a linear fashion, the host will

20   download the current page and the following page or two, up to the limit of the storage capacity of the display buffer 96. For security reasons, it is desirable to hold this amount of text to a minimum, so that the user does not have access to more than a limited portion of the text, and then only in a volatile form, making it substantially difficult for a user to make an illegal copy of a copyrighted work. The format in

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which text is stored and displayed at the terminal can be as either as characters or as a page image (in popular formats such as jpeg, tiff, and bmp), or as HTML, or a combination of these, and it is envisioned that graphics and text can be supported in color.

5   A feature of the present invention is that if internet web embedded hyperlinks are encountered in displayed text, the user can immediately jump to the page represented by that link, since he is continuously connected to the internet. Additional hyperlinks can also be imbedded in the text to control nearby networked appliances 28. For example, in an e-book cookbook, links can be embedded which 10   when activated program a microwave oven or other cooking appliance 28 via the BlueTooth link 24 to provide the correct setting for a cookbook recipe of interest.

If, at Figure 4, the user had chosen address book or appointments, the terminal 14 would be configured by the host to have the desired features for such applications. For example, the touch screen might be configured with icons representing a 15   keyboard for data input. All data input such as names, addresses, calendars, is stored at the host in the user's section of the memory 40. If Surf the Web is chosen as the application, the display 60 would be configured to act like a web browser.

If TV/radio schedules was selected, a program guide would be displayed from program guide information stored in the host database 18. The user can customize the 20   guide using terminal controls, and the customization would be stored in the user memory section 40. When viewing a program guide, hyperlinks can be embedded for the various broadcast programs. If the user is interested in a program, clicking on a link would cause the host to instruct the terminal to send an IR command, via the IR link 34 to the user's broadcast receiver 26 in the vicinity of the terminal. Thus, the

terminal 14 can be made to behave like a remote control for TVs, etc. The user can also instruct the host computer to send at the appropriate time IR commands to the user's VCR to set the correct channel and begin recording a show.

Alternatively, a clock located in the terminal 14 could be used to locally
5   trigger IR commands to receivers. During a setup phase, the user would identify to the host the type of broadcast and recording equipment she owns, so that suitable IR codes can be sent to the terminal to control the devices. Using the signals from the cell phone 36, the user's location can be determined using methods well known in the art. Using this location data, the host 12 can send the appropriate local broadcast
10   guides to the terminal 14, and can identify the correct station entities by their broadcast frequency. Additionally the user can send to the host her zip code, which is used to identify the user's cable company, and hence the correct channel lineup for cable TV. Yet another way of determining user location is by coupling the terminal 14 to a Global Positioning Satellite (GPS) receiver 26 in the vicinity via the
15   BlueTooth link 24.

Figure 5 shows an example of an FM radio log displayed on the terminal 14 for stations in the user's location of Pleasantville, showing what is playing now on multiple stations. This log is continuously updated in real time as a streaming log, without user intervention. Using soft buttons suitably programmed by the host 12, the
20   user can select from AM, FM, TV and satellite guides. Further, using cursor control buttons or the touch pen 63, the user can highlight a particular station (shown bold in the figure). Once highlighted, pressing the TUNE button will cause the terminal 14 to send control signals (IR or RF) to the local broadcast receiver (be it a home, car, or portable unit) to automatically tune it to the selected station.

As indicated above, during a system setup phase, the user identifies to the host

all of the broadcast equipment and other networked appliances to be controlled by the

terminal 14, and suitable IR and RF control codes are downloaded in RAM from the

host. In similar fashion, it is envisioned that the user will be able to use her broadcast

5   receiver to send a signal (IR or RF) to the terminal 14, where it is received and used to

automatically display the program log for the station the receiver is tuned to. Further,

it is contemplated that such control signals from broadcast receivers will also convey

information as to the identity of stations for which the receiver has been pre-

programmed by the user. Most modern receivers permit the user to pre-program or

10   store several stations in memory. By conveying these stations to the terminal 14 (and

hence to the host 12), the local program log shown in Figure 5 can be limited in scope

by the host 12 to only those programmed stations. Up and Down buttons can also be

used to manually tune a remote receiver to a designated stations, as shown by the

displayed station frequency.

15   Figure 6 shows an example of a program schedule for a particular FM radio

station that was either selected by the user from the log of Figure 5, or was

automatically detected by the terminal 14 as the station to which the user's local FM

receiver is tuned, as a result of IR or RF emissions from that receiver. Note that

while it is contemplated that broadcast receivers will be equipped with the BlueTooth

20   RF communications system, it is also possible to detect the station to which a

broadcast receiver is tuned by monitoring the frequency of the emissions from that

receiver's local oscillator in a manner well known to those in the art, and the RF

communications link 24 is presumed to include such local oscillator detection system.

Note that the station program schedule includes not only program selections

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but also advertising information. This station program schedule is also in the form of a streaming guide sent in real time and continuously updated from the host 12 to reflect what has recently been played, what is playing now (highlighted in bold) and what is upcoming next. Using the soft keys, the user can opt to tune to a different

5   station with the TUNE key, or select a particular item from the screen using cursor keys or the pen 63. Once an item is selected, the user has the choice of using the BUY, CALL, LINK or MARK keys to perform the following operations.

If the chosen broadcast selection involves a product or service which is for sale, by pressing the BUY key, the user can initiate a transaction with the host 12

10   where the item is purchased and billed to the cell phone bill for the cell phone 36 (or alternatively a credit card), and shipped to the billing address on file at the cell phone operator (or an alternate address on file at the host 12). For example, in the highlighted selection of Figure 6, prices are listed for the CD and the individual track for the music selection being played. The user may highlight one of these choices,

15   press the BUY button, and receive either the CD (shipped to his door) or the track, which would be stored in the user's storage area of memory 40 by the host in MP3 format (or other compressed audio format). The user can then listen to the track by selecting the Music option from the application menu of Figure 4, and as described below.

20   If a chosen broadcast selection involves information which must be conveyed by the user to a third party, such as the auto insurance quote ad in Figure 6, the user can press the CALL key and the third party will be dialed using the cell phone 36 and the number stored in the ad, whereby the user can carry on a conversation with the advertiser.

If a chosen selection includes a web address, the user may press the LINK key, and the linked web page will be displayed on the terminal 14 for further user interaction. If the user merely wants to save the web address for later access, the MARK key is pressed, and the web address, as well as the program schedule entry

5 corresponding thereto, is bookmarked by the host 12 in the user's memory 40 for later recall from the user's stored address book.

As described above, an RF or IR link is proposed from the receiver to the terminal 14 to determine the tuned station information. Yet another method uses the microphone of the cell phone 36 to pick up the audio signals emanating from radio

10 receiver speakers. This audio signal is converted to digital form by the audio circuits 82 as described above, and transmitted to the host 12. The host computer can then process this audio signal through pattern recognition software and compare it with audio signals then being aired by stations within the user's location. The audio signals can be easily obtained from the individual radio station web sites on the internet,

15 which generally include streaming audio corresponding to their broadcast signal. Such audio pattern recognition has been use for many years to track radio broadcasts, as described in U.S. Patent No. 4,843,562. One a pattern match is detected, the station can be identified by the host, and the proper station log information sent to the terminal 14 for display. A similar pattern matching method, using the optical features

20 of the system described below, can be used to automatically determine the station to which a TV receiver is tuned. While the above descriptions have assumed the broadcast receiver is remote from the terminal 14, it is contemplated that one or more broadcast receivers (and/or a GPS receiver) 26 can be incorporated into the housing of the terminal 14 or the phone 36.

If, at Figure 4, the user selected Music as the application, the terminal 14 would be configured to be able to select and receive streaming audio, preferably encoded in the MP3 format, from the host 12. Again, the audio may be stored in the user's section of the memory 40, and customized playlists created. The decoder 88 is

5   used to decode and provide the audio signals for listening via speakers or headphones. Because there is no storage of the entire music selection at the terminal (only a small volatile buffer is included in the MP3 decoder for streaming), it is extremely unlikely that the user will be able to make illegal digital copies of the music selection. As indicated above, purchased music using the system 10 can be stored in the memory 40

10   for future listening. Also, it is contemplated that the host 12 can download the lyrics of a song for display in synchronism with the music, where the lyrics appear on the screen 60 as the song is being played, as further disclosed in my issued U.S. Patent 5,408,686.

Due to the streaming nature of the lyrics, there is little likelihood of illegal

15   copying of copyrighted lyrics, and the synchronization is ideal for Karaoke and other sing-along entertainment. Rather than have a user select a song from an index, the cell phone microphone can be used to automatically identify a song playing in the vicinity of the user, as follows. In the Music mode, the user can be given a choice to have a song identified from its audio pattern. In this case, the phone microphone

20   picks up the audio signals from the source of the song (a nearby CD player, music being played in a restaurant, etc.), sends it thru the audio circuits 82 to the host 12, where the host computer uses audio pattern matching as described above to identify the song, and provide a copy of it to the user's storage area 40 for subsequent streaming download. Several companies, such as Mediabase Research, Los Angeles,

- 20 -

CA offer digital song databases for pattern recognition purposes.

If, in Figure 4, the user has selected Outdoor Promotions, the terminal 14 is configured so that the RF link 24 is set to receive BlueTooth compatible signals from interactive outdoor advertisements equipped with BlueTooth communications, such as

5   outdoor establishment signs, billboards, road warning notices, vending machines, gas pumps, ATMs, etc. The display of the terminal 14 in this application might look like that of Fig. 7. In this instance, the link 24 has detected three local ads in the vicinity of the terminal 14, has sent the RF data to the host 12, where it is interpreted and returned to the terminal 14 for display on the screen 60. The user can use cursor keys

·10   or the pen 63 to make a selection, after which the CALL, MARK or LINK keys can be used as follows. Typically, the data provided from the ad would be in the form of an ID number such as a bar code number, a web site address or a telephone number. When conveyed to the host 12, suitable search software will be used to find and index the particular ID code to the advertiser.

15   If the chosen ad includes a phone number and the user wishes to contact the advertiser, say to order take out food from a local restaurant, pressing the CALL button will auto dial the number using the cell phone 36, placing the user in contact . with the vendor. If the selection includes a web address, the user can either press the MARK key to bookmark the address and the ad in the host memory 40, and press the

20   LINK key to be connected to the web page immediately. Note that ads can also include coupon offers such as the one for gasoline in Figure 7. By pressing the MARK key, the ad is stored along with the web page and can be recalled later, from the user's host stored address book, to be shown on the display 60 to the vendor to show proof of the coupon.

A variety of billing options are available to the system operator for the present invention. For example, the user can be charged for reading a book prior to downloading any of the text, or the user can be billed on a pay-as-you-read basis, where he is just billed for the displayed pages. In addition to billing the user using a

5   credit card, the user can be automatically billed to his cell phone bill, eliminating the need for pre-registration or the transfer of sensitive credit information. In such instance, the host 12, which can identify the user by telephone number, communicates with the billing system of the communications network 42 to complete the billing transaction.

10   Because the user obtains data from the host in a rather continuous fashion, it is important that the terminal 14 be able to communicate with the host 12, even in areas where cell phone service is not available. For example, in an airplane, passengers are usually required to turn off all RF emitting devices during flight, which is also a time when users would like to access reading material. To overcome this problem, it is

15   envisioned that every airplane will be equipped with an on-board server connected via cables to each seat, whereby the server is connected via a satellite link to the internet and acts as a LAN for the passengers. Thus, the terminal 14 may be connected, via the USB to such a LAN 37 (in place of the phone 36) so that system operation is not interrupted during flight. Another instance where cell phone access may be limited is

20   on a cruise ship. In such instance, it is envisioned that every such vessel would also be equipped with an on-board server connected via cables to each seat, whereby the server is connected via a satellite link to the internet and acts as a LAN 28 for the passengers. Since RF emissions are generally not a problem on ships, and the passengers are mobile, the terminal 14 would communicate with this LAN 28 via

BlueTooth.

To further increase the usefulness of the terminal 14, it is desirable to provide it with multipurpose optical functionality 35. It is envisioned that an optical sensor array such as a CCD array used in digital cameras could be used to provide a variety

5   of functions, such as picture taking, page input and barcode reading, all without the need for a scanner. The digital output of such an array would be transmitted from the terminal 14 to the host 12, where substantial computational power is available to analyze and recognize various types of images. For example, if the array was used by the user to take a picture of a bar code on a product, it is envisioned that the host

10   computer, using pattern recognition, would recognize the image as a bar code, be able to interpret the UPC number of the product, and using suitable search software and the internet to find additional information about the product and relay it to the user.

Thus, as shown in Figure 4, another application of the terminal 14 which may be selected by the user is photography/optics. When selected, the user is presented

15   with a menu shown in Figure 8, for pictures, bar code detection, page input, or video. Selecting the pictures mode, the optics 35 is configured by the host 12 for ordinary picture taking, and the photos are uploaded for storage and later retrieval from the host memory 40. Selecting the barcode mode, the optics is configured by the host 12 for characteristics suitable for this application (macro focusing, etc.), and the

20   uploaded image is analyzed and product data retrieved as described above.

Thus, a user in a restaurant could take a picture of the UPC bar code of a bottle of wine and have the host retrieve product information for a future purchase. This product information is not only downloaded to the user but is also stored in host memory 40 for later access. If the user chooses the page input mode, the host

configures the optics to obtain good resolution when capturing a page image, such as a page from a print book or newspaper, and the host is enabled to provide optical character recognition (OCR) analysis to convert image text to character text for later

5   use. If the user chooses the video mode, the optical array is aimed at a television displaying a broadcast program, and the image being broadcast is transmitted to the host computer, which uses video pattern matching to determine the station to which the TV receiver is tuned. This information can then be used to download the proper station TV log to the user. Also, if the array can is aimed at a TV monitor displaying a DVD or videotape or PVR recording of a movie, such information can be sent to the

10   host, where the title of the movie is determined in a manner similar to that used for audio pattern matching, except using video pattern matching. Once the title is identified, a copy of the movie can be stored in the user's storage area for later viewing. As imaging arrays improve, it is envisioned that the same optical array could be used to read and provide to the host the user's fingerprint for improved

15   security.

Regarding security, it is envisioned that an encryption key which is user specific could be used to encrypt the downloaded data from the host to the terminal in a manner similar to that described in the '034 patent. However, in the present instance, the phone number and/or serial number embedded in the memory of the cell

20   phone 36 may be conveniently used for such purpose. As described above, this phone ID data has been made available to both the host (from the network 42) and to the terminal 14 (from the phone 36), so that it is a simple matter to use such ID for encryption and decryption of all data communications between host and terminal. The use of a smart card can also provide a secure user specific key for data security.

Yet another security technique is to have the host embed user traceable "watermark" data bits into downloaded data, which are not displayed but which survive any illegal copying of such data. In the event an illegal copy is found, the watermark can identify the source for further legal measures. Also, the BlueTooth communications

5   between the terminal and other devices would be encoded to provide a level of security as anticipated by the BlueTooth standards committee.

Further addressing the data security issue, it is important to limit the types of terminals which connect to the host 12 to those which are not capable of permanent storage of data, to avoid the opportunity to make illegal copies. It is envisioned that

10   the operating system command and control structure for operating the host would be proprietary to the operator of the system 10. While it might be desirable to combine the functions of the user terminal 14 into a notebook or sub-notebook type PC computer, one must overcome the problem that such computers are filled with non-volatile storage means for data, including hard drives, floppy disk drives, removable

15   disk drives, printers, and ports to external storage devices. It is envisioned as part of the present invention that the continuous 2-way nature of the present invention can be used to overcome these obstacles, as follows.

Most PCs run Windows or some other graphical user interface, and include the ability to network the computer to a host. It is also possible to place such a computer

20   into the role of a slave, or dumb terminal, whereby the PC is reduced to simply a keyboard, pointing device, and display, which is the desired configuration. Windows software includes some such modes of operation, under the names Terminal Mode, Hyper Terminal, PC Anywhere, Telnet, etc. The problem to be overcome is to ensure that the PC is running in this limited mode while connected to the host 12. In the

Windows network environment, it is possible to have a host computer monitor and control essentially all user functions, including the use of RAM storage, clipboards, screen grabbers, and access to drives and printers. Since the host 12 is always connected to the user's PC during viewing of a copyrighted work, it is possible for the

5   host to continuously monitor and block any attempts to store data from the screen buffer to a non-volatile medium. In the event such an action is detected or attempted, the user's session with the host can be terminated, and registration revoked for viewing any future works.

The present invention may be embodied in other specific forms without

10   departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

15   What is claimed is:

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1.   A communications system offering enhanced protection of a

2   copyrighted work, the system comprising:

a host site including a database for storing a copyrighted work and an interface

4   to a wireless data communications infrastructure;

a user terminal including a media player and an interface to the wireless data

6   communications infrastructure; and

software enabling the user terminal to receive portions of the copyrighted

8   work from the host database for reproduction through the media player without

storing the entire work at the location of the user terminal.

2.   The communications system of claim 1, wherein the wireless data

2   communications infrastructure includes a cellular telephone network.

3.   The communications system of claim 1, wherein the copyrighted work

2   is an audio, video, textual or graphical work.

4.   The communications system of claim 1, wherein the software enables

2   the user terminal to receive a plurality of sequential portions of the copyrighted work,

with each newly received portion replacing the previously received portion, until the

4   entire work has been played through the media player.

5.   The communications system of claim 1, further including a plurality of

2   user terminals, and wherein the host site further includes a user storage area enabling

information, which may include one or more copyrighted works, to be stored

4.   specifically with respect to one of the user terminals.

      6.   The communications system of claim 6, wherein the software enables a

2   user to annotate information or one of the copyrighted works stored in the user storage

area.

      7.   The communications system of claim 1, wherein the wireless data

2   communications infrastructure utilizes an internet protocol.

      8.   The communications system of claim 7, wherein the media player

2   includes a screen for displaying information with hyperlinks.

      9.   The communications system of claim 8, including a hyperlink enabling

2   a user to purchase goods or services through the system.

      10.   The communications system of claim 9, wherein the user is charged for

2   the goods or services by debiting an internet, telephone or credit account.

      11.   The communications system of claim 8, including a hyperlink enabling

2   a user to initiate a telephone call to a third party.

      12.   The communications system of claim 1, further including an interface

2   for controlling one or more devices proximate to the user terminal.

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13.. The communications system of claim 9, wherein the device is a
2   television receiver, enabling the terminal to function as a remote control thereof.

14.   The communications system of claim 1, wherein the user terminal is
2   further capable of downloading a radio or television broadcast guide from the host

site.

15.   The communications system of claim 1, wherein the user terminal is
2   further capable of uploading geographical information to the host site so that the user

receives a radio or television broadcast guide appropriate to their location.

16.   The communications system of claim 1, wherein the user terminal is
2   further capable of uploading audio, video, graphical or textual information to the host

site for analysis at the host site.

17.   The communications system of claim 19, wherein the audio, video,
2   graphical or textual information includes a portion of a radio or television broadcast.

18.   The communications system of claim 19, wherein the user terminal
2   includes a sound or picture gathering apparatus, and the audio or audio, video,

graphical or textual information is derived through the sound or picture gathering
4   apparatus.

19.   The communications system of claim 18, wherein the audio, video,

2   graphical or textual information includes a computer-readable code or a fingerprint.

      20.   The communications system of claim 1, wherein the user terminal

2   forms part of a telephone, and a telephone number or serial number is used to encrypt

or decrypt communications to or from the host site.

      21.   A method of delivering information to a recipient, comprising the steps

2   of:

      providing the information at a server location;

4   receiving a request for the information from a client;

      delivering the information to the client from the server, with at least a portion

6   of the delivery occurring through a wireless data communications infrastructure, and

      wherein:

8   a)   the information is delivered in increments to the client, and

           b)   each new increment replaces one or more previous increments so that

10   the client may never store all of the information.

      22.   The method of claim 21, wherein the increments are stored in a volatile

2   memory at the location of the client.

      23.   The method of claim 21, wherein the information is a copyrighted

2   literary, musical, or visual work.

      24.   The method of claim 21, wherein the wireless data communications

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2   infrastructure is a cellular telephone network.

25.   The method of claim 21, wherein the host site further includes a user

2   storage area enabling certain information to be stored with respects to a particular

client.

26.   The method of claim 25, further including the step of enabling a client

2   user to annotate information stored in the user storage area.

27. ·   The method of claim 21, wherein the wireless data communications

2   infrastructure utilizes an internet protocol.

28.   The method of claim 27, wherein the information includes one or more

2   hyperlinks.

· 29.   The method of claim 28, further including the step of enabling a user at

2   the client location to purchase goods or services.

30.   The method of claim 29, further including the step of charging the user

2   for the goods or services by debiting an internet, telephone or credit account.

31.   The method of claim 28, further including the step of initiating a

2   telephone call to a third party through selection of a hyperlink.

33.   The method of claim 21, wherein the client comprises a portable user

2   terminal.

34.   The method of claim 33, further including the step of controlling one

2   or more devices proximate to the user terminal.

35.   The method of claim 34, including the step of controlling a television

2   · receiver. ·

36.   The method of claim 21, further including the step of downloading a

2   radio or television broadcast guide from server to the client.

37.   The method of claim 36, further including the step of uploading

2   geographical information to the server so that the client receives a radio or television

broadcast guide appropriate to their location.

38.   The method of claim 21, further including the step of uploading audio,

2   video, graphical or textual information to the server for analysis at the server location.

39.   The method of claim 38, wherein the audio, video, graphical or textual

2   information includes a portion of a radio or television broadcast.

40.   The method of claim 38, further including steps of:

2   providing sound or picture gathering apparatus at the location of the client,

and

4   deriving the audio or audio, video, graphical or textual information using the sound or

picture gathering apparatus.

     41.   The method of claim 38, wherein the audio, video, graphical or textual

2   information includes a computer-readable code or a fingerprint.

     42.   The method of claim 1, wherein the user terminal forms part of a

2   telephone, and the method further includes the step of using a telephone number or

serial number to encrypt or decrypt communications to or from the server.

FIG. 1

FIG. 2

FIG. 3

CHOOSE AN APPLICATION

•BOOKS   ●

•PUBLICATIONS   ●

•ADDRESS BOOK   ●

•APPOINTMENTS   ●

•GAMES   ●

•SURF THE WEB   ●

•TV/RADIO SCHEDULES   ●

•MUSIC   ●

•OUTDOOR PROMOTIONS   ●

•PHOTOGRAPHY/SCANNING   ●
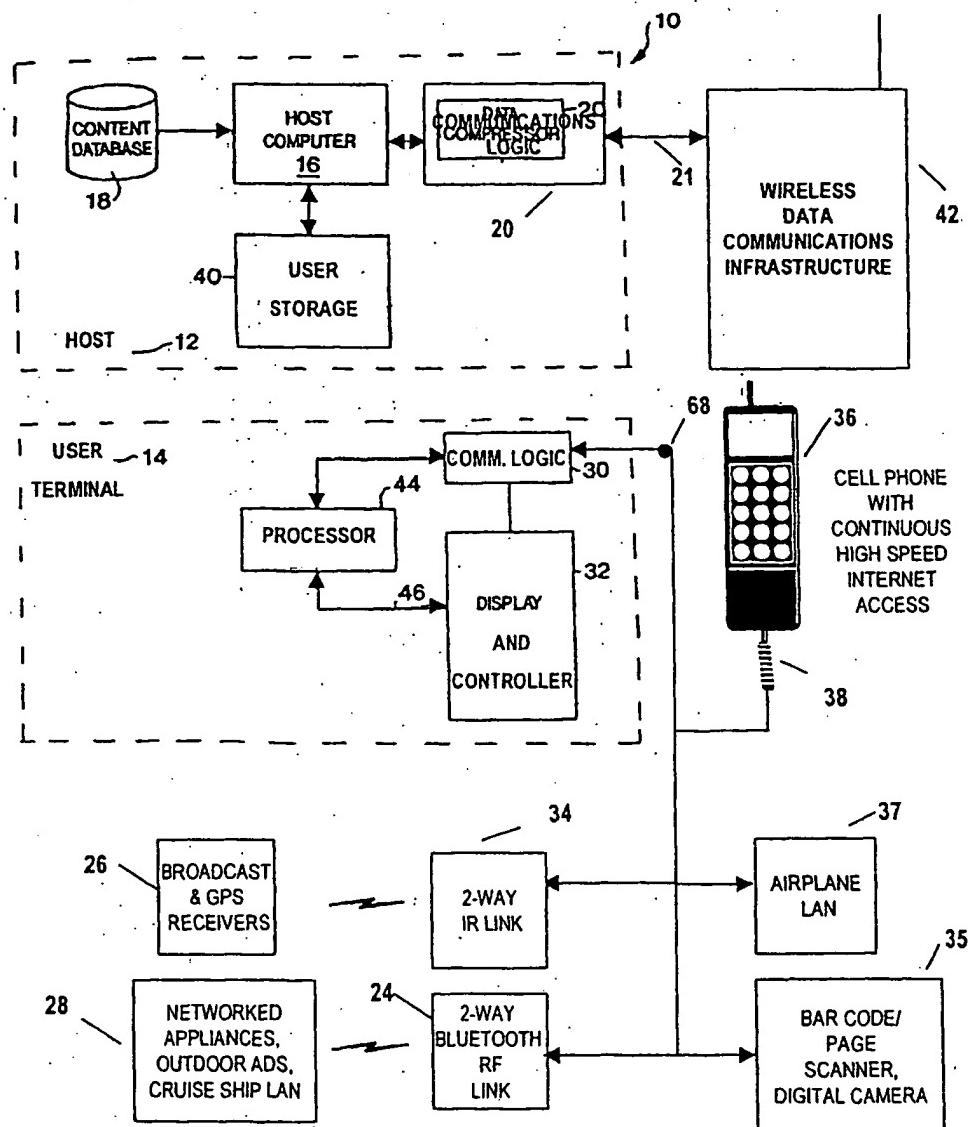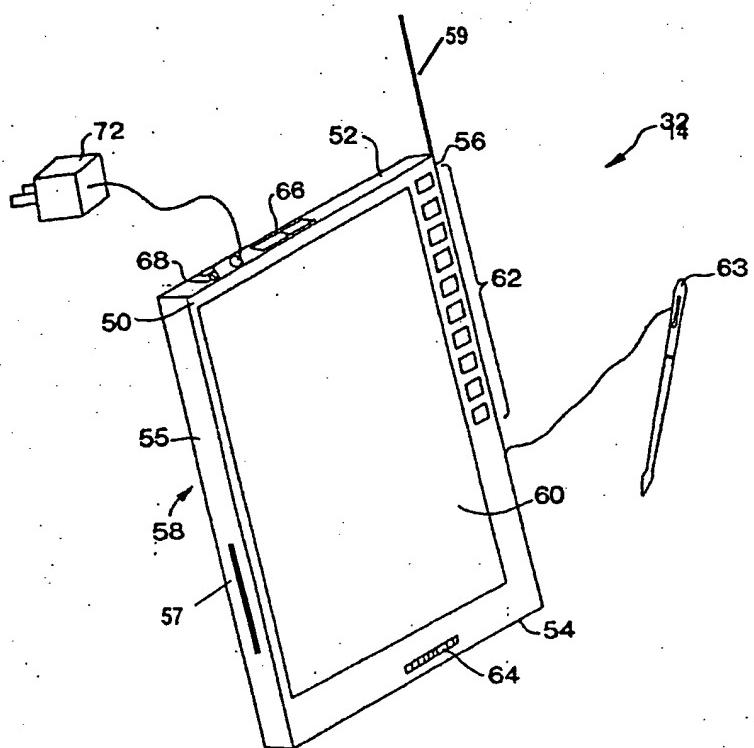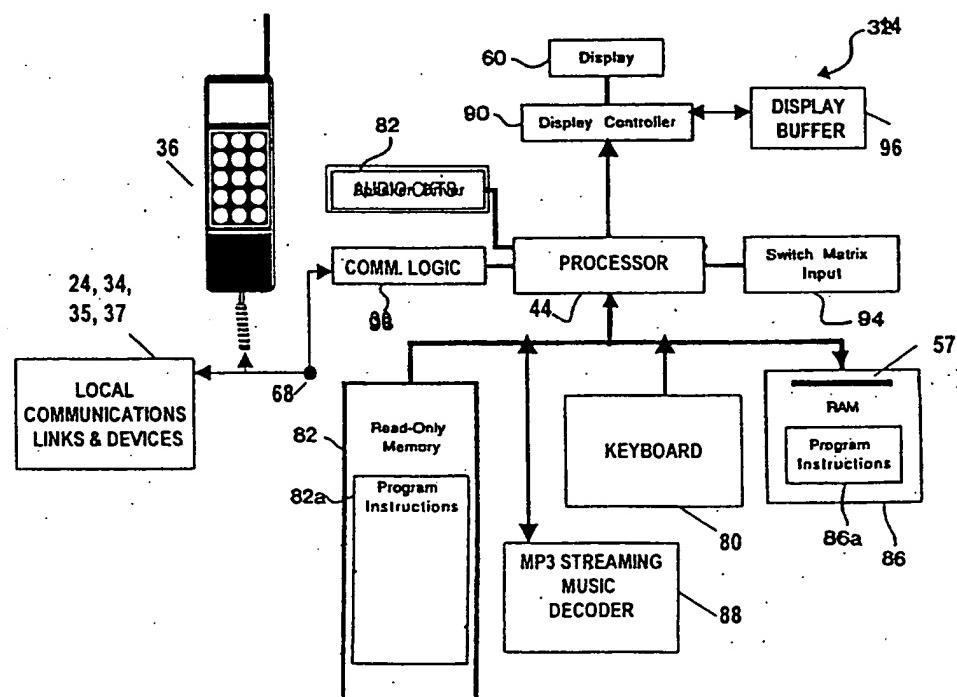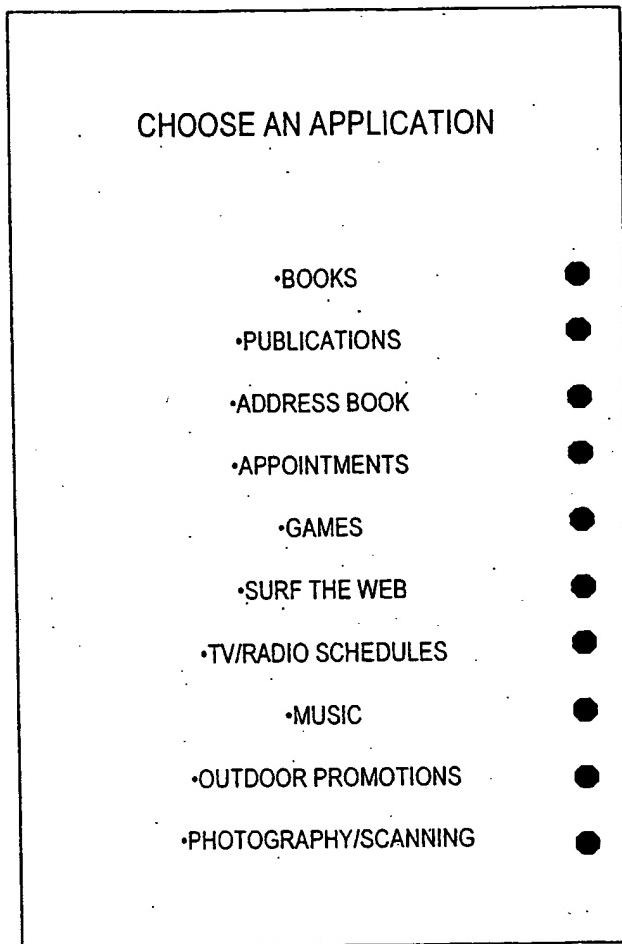
FIG. 4

PLEASANTVILLE FM RADIO PROGRAM LOG

FORMAT	STATION	SONG/ PROGRAM	ARTIST/HOST
COUNTRY	KXTU .92.3	WHEN I SAID I DO	CLINT BLACK
ROCK	KMMR 93.1	YOU WANTED MORE	TONIC
TOP 40	KSTW 93.9	REAL WORLD	MATCHBOX 20
ROCK	KYSP 94.3	WAS	KENNY SHEPHERD
TOP 40	KPST 95.1	AMAZED	LONESTAR
URBAN	KUSL 97.5	FORTUNATE	MAXWELL
ALTERNATE	KPLY. 97.9	NEVER LET YOU GO	3RD EYE BLIND
SOFT ROCK	KBEB 98.3	KOKOMO	BEACH BOYS
CLASSIC ROCK	KTOQ ·98.7	BRING IT ALL TO ME	BLAQUE
CLASSICAL	WXXR 96.3	Concerto for Trumpet No 2	English Chamber Orchestra
TOP 40	KMGK 99.1	3 AM	MATCHBOX 20

TUNE

FM

AM

TV

SAT.

96.3 FM

FIG. 5

FIG. 6

LOCAL OUTDOOR
PROMOTIONS

DANNY'S ITALIAN RESTAURANT
OPEN 24 HOURS
2347 Elm Street
See our web site for menu
818-555-6832   www.dannys.com/5603

FRED'S SHELL STATION
6704 Birch Street
Easy Freeway Access
Only $1.10/gal for Premium w/ this ad coupon
818-555-9684   www.fredsshell.com/2294

MERCURY INSURANCE COMPANY
GET A QOUTE FOR AUTO INSURANCE
**1-800-555-7685   www.mercinsur/com/6539**
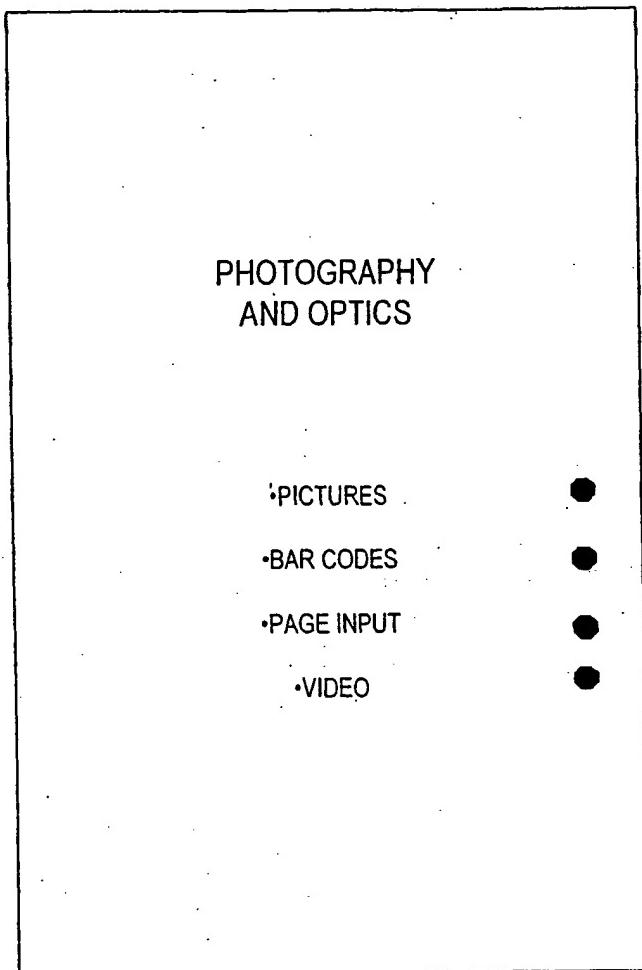
CALL

MARK

LINK

FIG. 7

PHOTOGRAPHY
AND OPTICS

·PICTURES ●

·BAR CODES ●

·PAGE INPUT ●

·VIDEO ●

FIG. 8

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 15/16
US CL :709/219

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/219, 203, 217

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

STN, WEST
Search terms : media players, audio clips, video clips, audio on demand, video on demand, thin clients, copyright protection.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,E	US 6,199,099 B1 (GERSHMAN et al) 06 March 2001, Abstract, Figures 17-18 and 27B, Col. 1, Line 21 - Col. 3, Line 2, Col. 34, Line 58 - Col. 36, Line 3, Col. 57, Line 12 - Col. 59, Line 15.	1-42.
Y,P	US 6,151,634 A (GLASER et al) 21 November 2000, Abstract, Col. 25, Lines 13-67.	1-42
A,P	US 6,154,773 A (ROBERTS et al) 28 November 2000, see the whole reference.	1-42
A	US 5,956,716 A (KENNER et al) 21 September 1999, see the whole reference	1-42
A	US 5,930,765 A (MARTIN) 27 July 1999, see the whole reference	1-42

☐ Further documents are listed in the continuation of Box C.   ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document i combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 APRIL 2001	**30 APR 2001**

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	AYAZ R. SHE~~~~~~
Facsimile No. (703) 305-3230	Telephone No. (703) 305-9648

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